P/Models/14

UNCLASSIFIED

A. V. ROE CANADA LIMITED

MALTON, ONTARIO

ANALYZED

INITIAL PROJECTS OFFICE

AIRCRAFT ENGINEERING DIVISION

N.A.E. 'LOW SPEED' MODEL

FULL SPAN

SCALE .07

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Approved by J. A. Chamberlin
Date November 6th, 1953.

Date:
Issue: 3

WING DATA

'C-105 AIRCRAFT'

DESCRIPTION

The profile of the 'wing' and 'vertical tail' do not follow the usual conical pattern having the leading and trailing edge a generator of a single cone. Wing percent lines will therefore, not be straight unless they coincide with the generatrix pattern of the local 'ruled surface'.

The wing will contain 2 separate compatible groups of 'ruled surfaces' terminating at the transport joint. These groups are generated from a pattern of 3 directrix curves located spanwise at wing chord stations 'A - B & C'. This does not imply that the directrix at station 'B' generates a common profile at the transport joint, since the outer wing profile is generated from second directrix at 'C' different in profile to the main panel directrix at 'A'. This results in a slight discontinuity at the transport joint.

The directrix at chord 'C' (tip) is a basic N.A.C.A. .0003-63.7 section having its maximum thickness value (m) at .365 percent of the local chord. At chord 'B' the 'm' value has been factored to .3400 percent of the local chord. At chord 'A' the 'm' value has been factored to .321220 percent of the local chord.

The main panel extends from the aircraft centre line to the transport joint and is made up of 4 separate ruled surfaces. The directrix at chord 'A' & 'B' follow a profile as shown on sheet 7-1-03 to 011. Ruled section -1-2- will have as outer generators the wing leading edge and the front spar. Ruled section -2-4- will have as outer generators the front spar and main spar. Ruled section -4-6- will have as outer generators the main spar and rear spar. Spars -5- being generators of ruled section -4-6-. Ruled section -6-8- will have as outer generators the rear spar and trailing edge and will be flat in profile with a plane angle of 1° 25' (tan .0248 9975) about the mean line.

The outer panel extends from the transport joint centre line to the tip and is made up of 2 separate ruled surfaces. The directrix at chord 'B' & 'C' follow a profile as shown on sheet 7-1-03 to 011 inclusive. Ruled section -1-9- will have as outer generators the wing leading edge and the flat plane tangent line. The spar arrangement will then coincide with the generating pattern. Ruled surface -9-8- will have as outer generators the flat plane tangent line and the trailing edge, and being flat the generators are not sensitive to any pattern.

Since all three section airfoils are different, it follows that no two generators are parallel or intersecting - hence a warped surface.

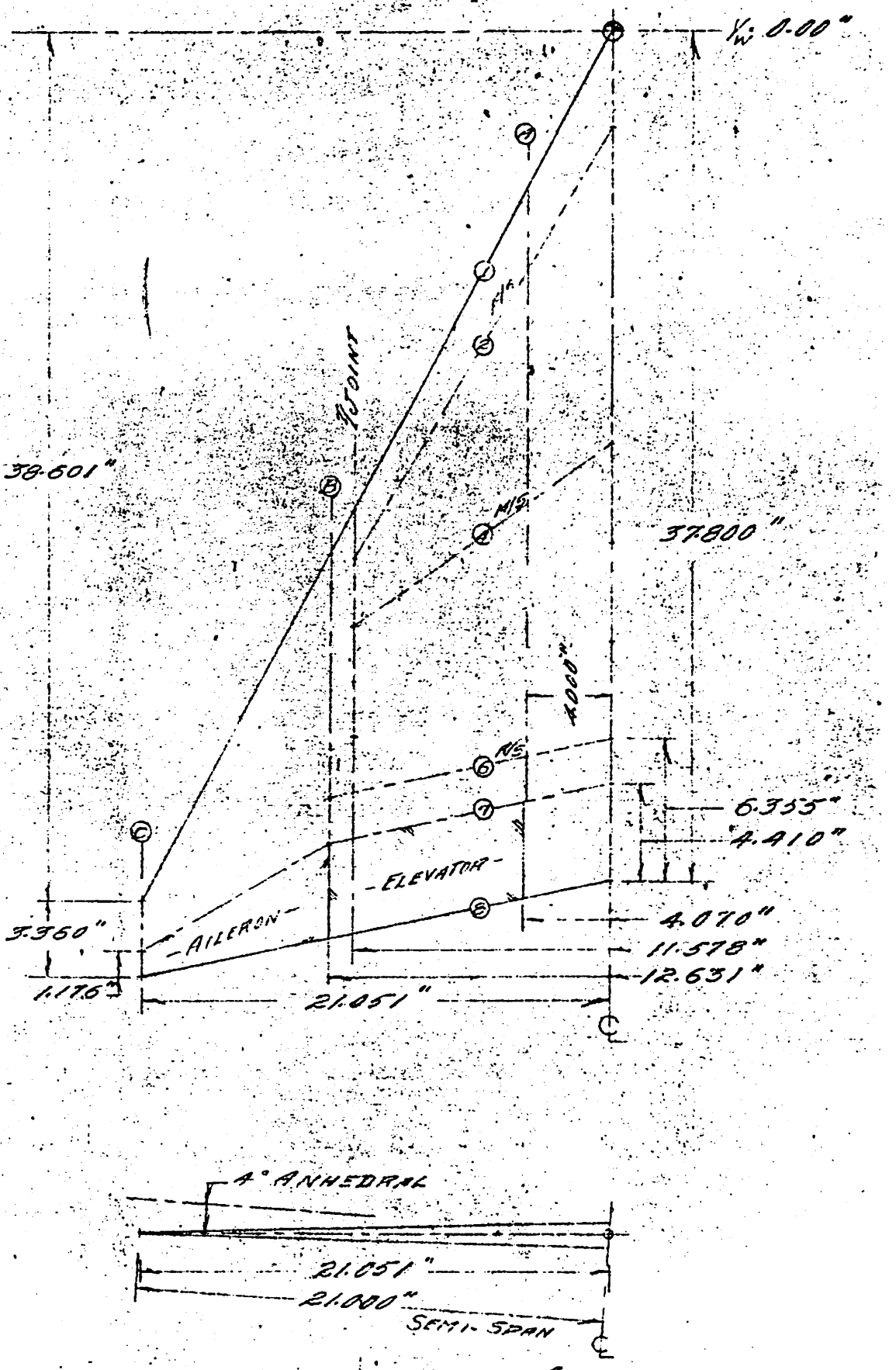
The camber 'Mean Line' is not sensitive to position and follows a normal conical pattern from root to tip. Its 'm' value remains constant at .321220 percent and its flat plane tangency at .625 percent of the local chord.

INDEX

'C-105 AIRCRAFT'

CHORD PLANE
UNLESS NOTED

SPAR GEOMY
SEE 7-11

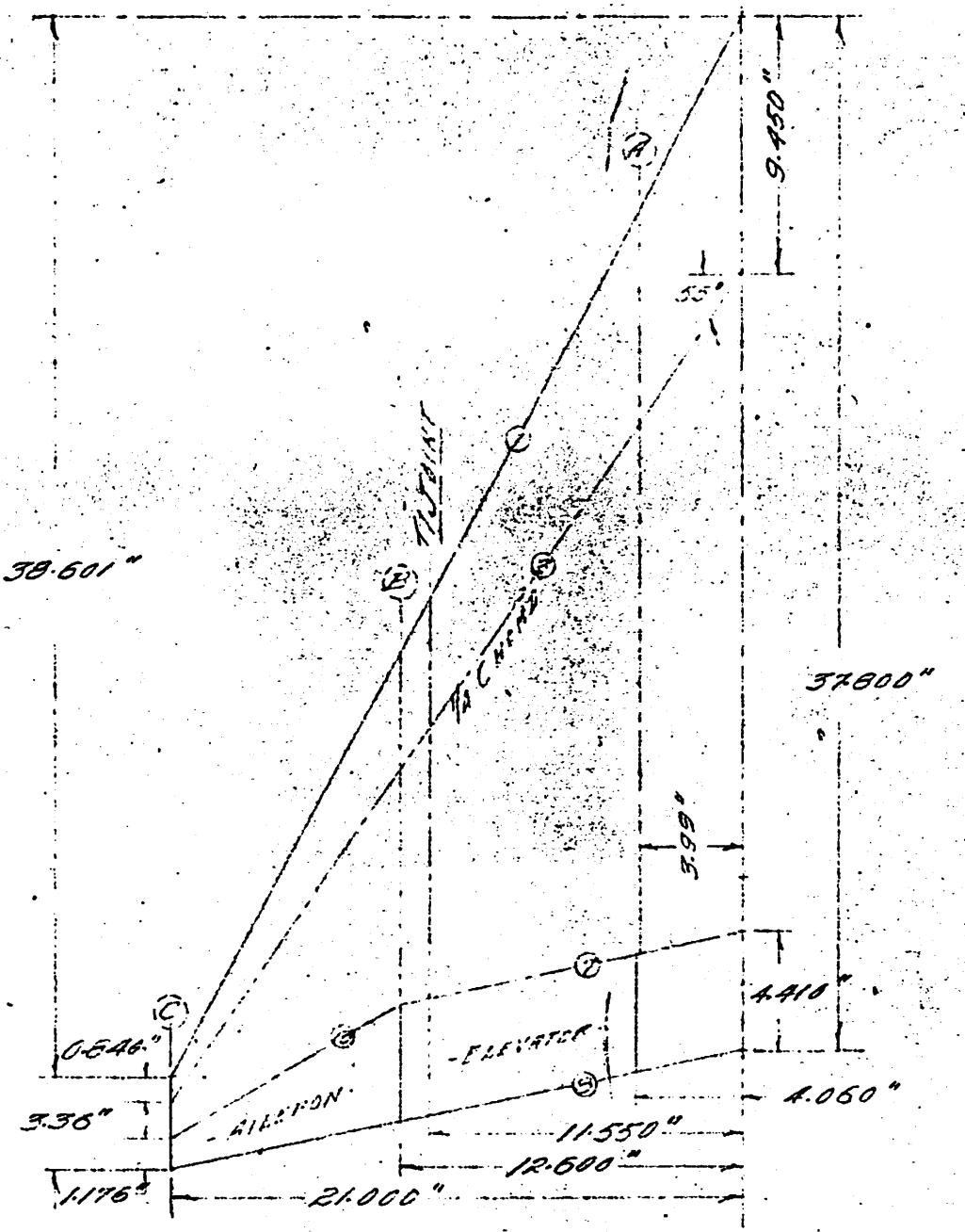


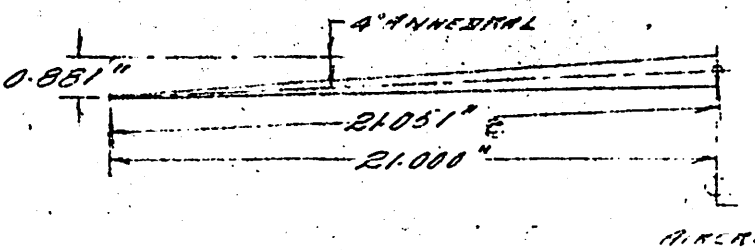
WING DATA

C-105 AIRCRAFT

PLAN VIEW

PROJECTED WING PLANE DATA UNLESS NOTED ©





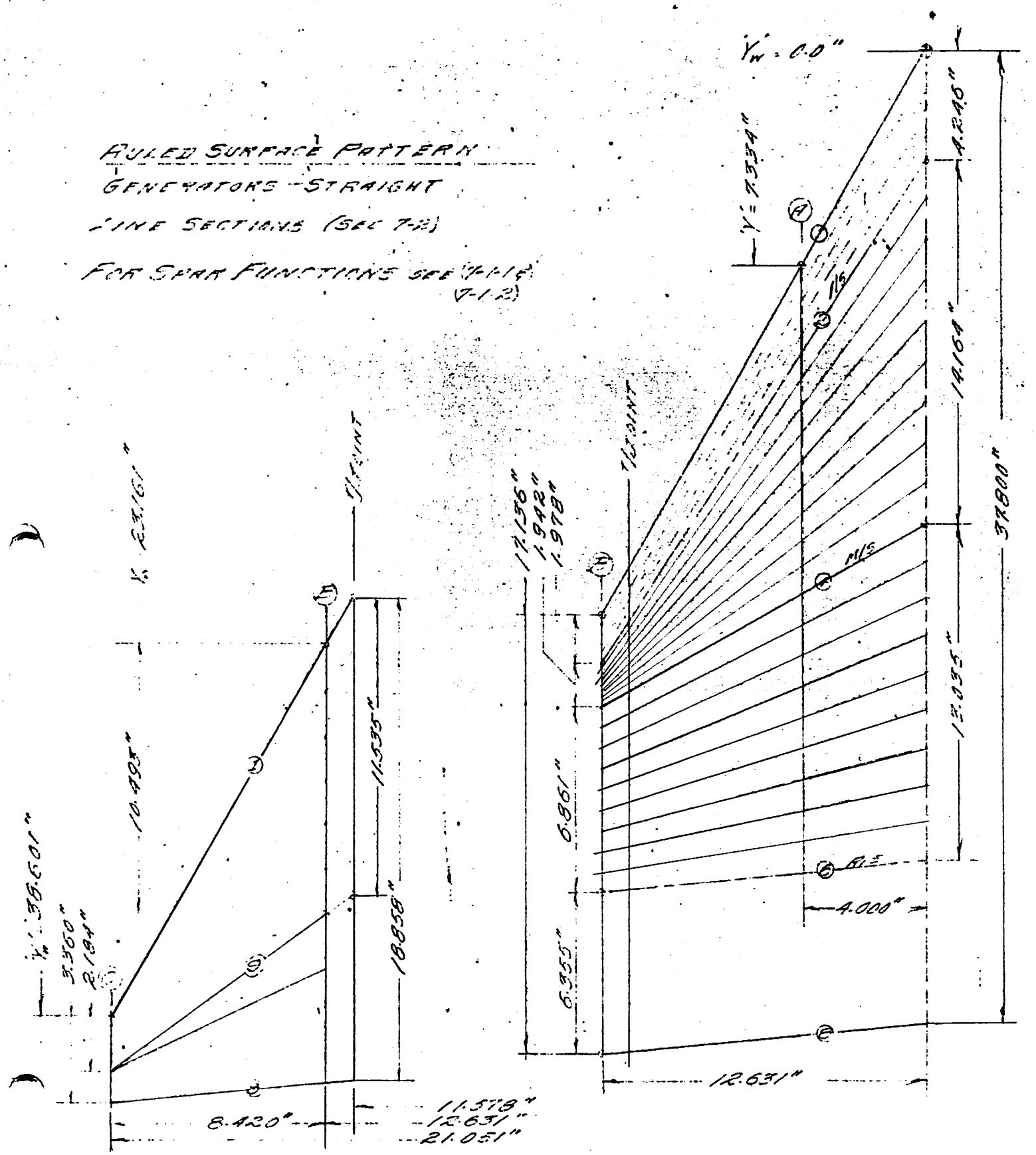
AIRCRAFT

RULED SURFACE PATTERN

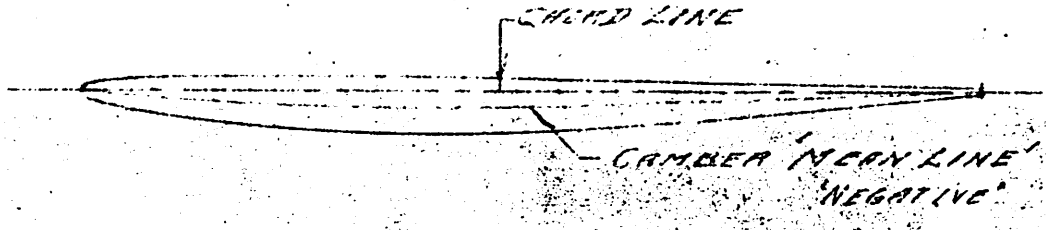
GENERATORS - STRAIGHT

LINE SECTIONS (SEC 7-2)

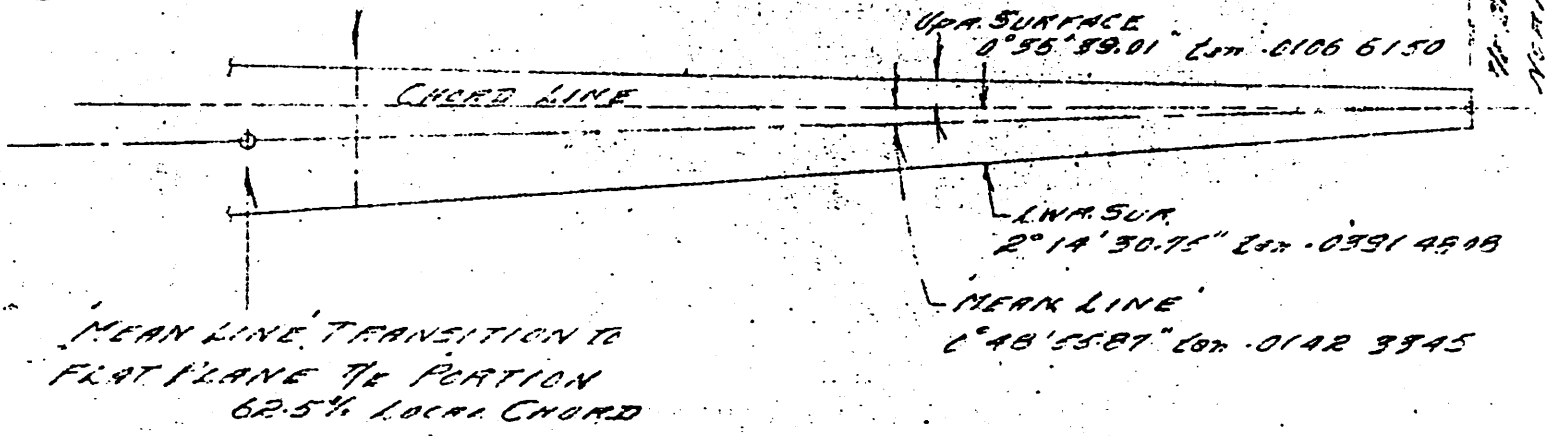
FOR SPAR FUNCTIONS SEE (7-1-1, 7-1-2)



CAMBER DESCRIPTION



ALL SPARS NORMAL TO CHORD



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WING DATA

'C-105 AIRCRAFT'

CHORD PLANE DATA

MAIN WING

NO.	DESCRIPTION	TRIG. FUNCTION				COORDINATE DATA ROOT	COORDINATE DATA T/JOINT
1	Leading Edge	Cotan	.5453	54289	X_w	0.00	11.578
	61° 23' 38.29"	Sin	.8779	3258	Y_w	0.00	21.231
		Cos	.4787	8428	Z_w	0.00	0.00
2	Front Spar	Cotan	.6045	41278	X_w	0.00	11.578
	58° 50' 43.10"	Sin	.8557	7362	Y_w	4.246	23.398
		Cos	.5173	5046	Z_w	0.00	0.00
4	Main Spar	Tan	.6864	71706	X_w	0.00	11.578
	34° 28' 6.59"	Cos	.8244	3757	Y_w	18.410	26.358
		Sin	.5659	5300	Z_w	0.00	0.00
5-A	Centre Spar 'Fwd'	Tan	.5235	36245	X_w	0.00	11.578
		Cos	.8859	0522	Y_w	22.755	28.817
		Sin	.4638	6628	Z_w	0.00	0.00
5-B	Centre Spar 'Aft'	Tan	.3606	00783	X_w	0.00	11.578
		Cos	.9407	0715	Y_w	27.100	31.275
		Sin	.3388	0346	Z_w	0.00	0.00
6	Rear Spar	Parallel to trailing edge			X_w	0.00	12.631 B
					Y_w	31.445	33.942 B
					Z_w	0.00	0.00
7	Elevator Hinge	"	"		X_w	0.00	12.631 B
					A Y_w	33.390	35.887 B
					Z_w	0.00	0.00
8	Trailing Edge	Tan	.1976	65322	X_w	0.00	12.631 B
	11° 10' 52.51"	Cos	.9810	1865	Y_w	37.800	40.297 B
		Sin	.1939	1336	Z_w	0.00	0.00

KEY

Angles represent sweep

A This T/E value (4.410") constant to X_w = 12.631" (elevator tip)

B These values taken at elevator tip (Directrix 'B')

X_w Spanwise value

Y_w Chordwise value

Z_w Vertical value

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1/8 = PI14 x 14.28571429 / 8
= 1.785714246

WING DATA

C-105 AIRCRAFT

DIRECTRIX 'A'

CODE		Y_R	Z_R UPR.	Z_R LWR.
	1	0.00	0.00	0.00
	2	0.040	0.049	0.056
	3	0.233	0.108	0.133
	4	0.698	0.165	0.231
	5	1.163	0.194	0.299
	6	1.861	0.218	0.378
	7	2.559	0.231	0.441
F/S	8	3.528	0.240	0.512
	9	4.003	0.242	0.541
	10	5.021	0.244	0.593
	11	6.038	0.245	0.635
	12	7.056	0.244	0.666
	13	8.073	0.242	0.687
	14	9.090	0.240	0.700
	15	10.108	0.236	0.703
	16	11.125	0.232	0.700
	17	12.143	0.226	0.693
	18	13.160	0.220	0.679
	19	13.822	0.214	0.668
	20	14.833	0.205	0.647
	21	16.023	0.193	0.615
	22	17.094	0.182	0.581
	23	18.403	0.169	0.534
	24	19.362	0.158	0.497
	25	20.188	0.149	0.465
	26	21.378	0.137	0.418
	27	22.568	0.124	0.372
	28	23.758	0.111	0.325
R/S	29	24.902	0.099	0.280
(1)	30	26.846	0.078	0.204
(2)	31	26.846	-	0.063
(3)	32	31.256	0.031	0.031

(1) Elevator Spar
(2) Mean line location
(3) Trailing edge depth taken normal to mean line R/S to 3 flat plane area

1.7857051

2.0833226

WING DATA

C-105 AIRCRAFT

DIRECTRIX 'B'

CODE		Y_R	Z_R UPR.	Z_R LWR.
	1	0.00	0.00	0.00
	2	0.022	0.027	0.029
	3	0.130	0.058	0.072
	4	0.391	0.087	0.125
	5	0.652	0.102	0.162
	6	1.044	0.115	0.206
	7	1.435	0.124	0.240
F/S	8	1.978	0.130	0.279
	9	2.068	0.130	0.285
	10	2.260	0.131	0.296
	11	2.452	0.132	0.307
	12	2.644	0.133	0.317
	13	2.836	0.134	0.326
	14	3.028	0.134	0.334
	15	3.219	0.134	0.342
	16	3.411	0.134	0.349
	17	3.603	0.134	0.355
	18	3.795	0.134	0.360
	19	3.920	0.134	0.364
	20	4.546	0.134	0.377
	21	5.283	0.132	0.385
	22	6.020	0.130	0.385
	23	6.757	0.128	0.381
	24	7.351	0.126	0.374
	25	7.862	0.123	0.367
	26	8.578	0.120	0.351
	27	9.336	0.113	0.331
	28	10.073	0.106	0.307
R/S	29	10.781	0.099	0.280
(1)	30	12.726	0.078	0.204
(2)	31	12.726	-	0.063
(3)	32	17.136	0.031	0.031

(1) Elevator spar
(2) Mean line location
(3) Trailing edge depth taken normal to mean line R/S to a flat plane area

WING DATA

C-105 AIRCRAFT

DIRECTRIX 'C'

CODE		Y_R	Z_R UPR.	Z_R LWR.
	1	0.00	0.00	0.00
	2	0.011	0.009	0.010
	3	0.054	0.016	0.021
	4	0.117	0.021	0.032
	5	0.219	0.024	0.044
	6	0.352	0.027	0.055
F/S	7	0.410	0.028	0.059
	8	0.481	0.029	0.063
	9	0.605	0.030	0.069
	10	0.725	0.030	0.073
	11	0.841	0.030	0.077
	12	0.953	0.030	0.079
	13	0.971	0.030	0.079
	14	1.062	0.030	0.080
	15	1.167	0.030	0.080
	16	1.269	0.030	0.080
	17	1.368	0.030	0.079
	18	1.465	0.030	0.078
	19	1.558	0.029	0.077
	20	1.649	0.029	0.076
	21	1.669	0.029	0.075
	22	1.737	0.029	0.074
	23	1.822	0.028	0.071
	24	1.906	0.028	0.069
	25	1.987	0.027	0.066
	26	2.066	0.027	0.064
	27	2.142	0.026	0.061
(14)	28	2.184	0.026	0.059
(2)	29	2.184	-	0.017
(3)	30	3.360	0.013	0.013

(14) Aileron spar ℄ point of tangency (O/W flat plane)
(2) Mean line location
(3) Trailing edge depth taken normal to mean line
(14) to (3) flat plane area

17.546"
3.366"
1.008"
10.680"
11.021"
4.630"
0.420"
0.341"
ROOT CHORD
DIRECTRIX
1.653"
15.366"
'A'
SECT A-A
0.420"